

Fermilab Computing Division - Argonne Shared Activities

The Fermilab Computing Division collaborates with the ANL Mathematics and Computer Science Division (MCS), the High Energy Physics, and the APS Divisions on a range of research, developments and support activities. These range from more informal software support activities, such as shared knowledge and information on security tools and technologies, to large programmatic activities such as developments for the ILC and deployment of large scale cyberinfrastructures.

Several of these activities, in addition to the obvious opportunities offered by the ILC, have potential for future broader collaboration and benefit to both organizations:

Accelerator Modeling and Simulation—extensions to support Nuclear Physics and other related domain science applications.

Peta-Scale Computing—in the use, technologies, and management of the ANL Leadership Blue-Gene machine and peta-scale facilities of the Great Lakes Consortium.

Next Generation Intelligent Networks—for example general services to store and access large scale widely distributed datasets (including high-throughput movement, cataloging and management of data)

Shared Cyberinfrastructure—through increased cooperation in OSG and TeraGrid support for universities and international interoperation, and including the next generation security and trust infrastructures.

Engagement of New Scientific Domains—for example through increased collaboration with of Fermilab the ANL-University of Chicago Computational Institute.

Accelerators

International Linear Collider Controls

The ILC Controls activity includes engineers, physicists and computing professionals from both Fermilab CD and ANL. This includes work on the ILC Global Design Effort (GDE) costing exercise, the ILC Reference Design Report (RDR) and test facilities at Fermilab. Activities in support of the development of the ILC Test Area at Fermilab (ILCTA) include accelerator controls and timing, and Low Level RF (LLRF) systems. Future activities include the Engineering Design Report (EDR) for the ILC controls system.

Accelerator Modeling and Simulation

Members of the Accelerator System (AS) Division at Argonne and the Computational Physics for Accelerators Group (CPA) in the Fermilab Computing Division are collaborating on the ILC Damping Ring (DR) Beam Physics issues. Newly developed large software systems are being used to simulate collective effects on the positron bunch circulating in the DR, including looking at the electron cloud effect on the beam emittances. This joint effort is being done in the software framework of Synergia, http://cd-amr.fnal.gov/aas/Advanced_Accelerator_Simulation.html and other codes. The CPA

group collaborates with members of the ANL MCS Division to further develop Synergia. ANL MCS and AS Division members are participating in a Fermilab CPA lead proposal which targets HEP, NP, and BES applications via the development of petascale parallel software. In addition, the current round of shared activities is stimulating potentially interesting collaborative research into microscopic accelerators, which could bring Argonne nano-technology, and Fermilab accelerator research into closer collaboration.

Computing Facilities and Infrastructure

Central Services and Computer Security

There is a close informal working relationship between Fermilab CD and ANL on many activities related to core computing services and cybersecurity. Examples include: Kerberos; AFS; Windows operating system support; ORACLE database management systems; sharing of information on security exploits, alerts and common phishing attacks; shredding magnetic media during the current embargo etc.

Business and Administrative System Warm-Backups

Fermilab and ANL host and support warm-backups of each other's administrative and business systems. At Fermilab this is housed in the Feynman Computer Center. The support, security and access controls are defined through a Memorandum of Understanding. <http://cd-docdb.fnal.gov:8080/cgi-bin/RetrieveFile?docid=1208&extension=pdf> (password/certificate access only). Fermilab business services places Windows Domain Controllers and other central services at ANL as part of their disaster recovery project.

Use of new ANL Blue-Genie Facility

The Fermilab lattice gauge theory group (and the MILC collaboration) are members of the USQCD collaboration <http://usqcd.fnal.gov/>. USQCD's QCD simulations are expected to be one of the four early user groups on the Argonne Blue Gene-P.

Great Lakes Consortium for Petascale Computing

Fermilab and ANL are members of the Great Lakes Consortium for Petascale Computing (GPCPC) led by NCSA at the University of Urbana Champaign. A proposal for the acquisition and deployment of a petascale computing system is being submitted to the National Science Foundation to acquire and deploy a petaflop IBM system that supports a broad range of scientific research problems. Fermilab plans to collaborate on data storage and movement, security, C++ application support and system manageability and fault tolerance developments.

Networks and Grids

ESNET Chicago Metropolitan Area Network (MAN)

The Fermi - Argonne Network Group (FANG) manages the Chicago MAN operation. The ESnet Chicago MAN consists of an optical network infrastructure that provides high bandwidth (10 Gb/s) point-to-point data channels ANL & FNAL and the ESnet points-of-presence in the Chicago area (Qwest PoP/NBC Building & StarLight downtown

Chicago). The MAN operational support consists of a coordinated effort between the ESnet and Laboratory network staff. ANL & FNAL provide both normal work day operational support and off-hours coverage. There are common interests in processing and exploiting routers' summary data on network flows.

Advanced Data Movement and Placement

The Center for Enabling Distributed Petascale Science (CEDPS) DOE SciDAC-2 project aims to create technical innovations necessary for large distributed communities, for example the US LHC experiments, to place and access shared data. The focus of the Fermilab CD – ANL shared activities in CEDPS is on “managed data transfers” extending and integrating Globus high throughput file transfer service, GridFTP, and Fermilab storage resource and disk cache management software (SRM/dCache). Also, Fermilab is a co-chair with ANL of the Open Grid Forum GridFTP working group, which has extended the standard to meet the needs of HEP and other physics collaborations.

As part of CEDPS and the MAN network activities Fermilab and ANL continue to cooperate on researching the advanced use and management of networks for HEP and other scientific data.

Open Science Grid and TeraGrid

The Open Science Grid (OSG) is a five-year project jointly funded by the DOE and NSF to maintain and evolve a national distributed computing infrastructure for large-scale scientific research. Members of Fermilab and ANL staff hold leadership positions in OSG, with other members of the staff part of the project and the institutions being active members of the Consortium. The US LHC experiments (as well as LIGO, SDSS, Run II etc.) rely on the OSG to operate and sustain the core common distributed facility in the US on which their distributed analysis systems are built. Among OSG's goals is to interoperate and cooperate with other shared cyberinfrastructures. Existing collaborative activities with the national TeraGrid facility include security, the reference software stack, outreach and training with Campus Cyberinfrastructures, and education through grid schools. The Genome Analysis and Database Update (GADU) project at ANL is able to obtain significant computational throughput using both OSG and TeraGrid.

Grid Security Services

Fermilab and the ANL Globus team have shared activities to integrate and extend grid identification and authorization services. Services deployed on the OSG provide the US LHC and other experiments the necessary management to prioritize user jobs and control of shared access to data storage. These services are integrated with the Globus GSI security as part of the common grid infrastructure.

Other

Environmental Site: Argonne has an environmental site in a field near CDF for which Fermilab Networks support the connectivity needs.

US LHC Experiments Software Support: Fermilab and ANL physicists and computing professionals working on the ATLAS and CMS experiments collaborate on the development and support of software tools such as the ROOT analysis system, calibration and meta-data catalogs/databases.

-----Original Message-----

From: Bruce Chrisman [mailto:chrisman@fnal.gov]
Sent: Tuesday, January 09, 2007 2:33 PM
To: Bill Griffing; Dave Carlson (Work); Kay VanVreede (Work); Roger Dixon; Victoria White; James Strait; Victor Yarba; Randy Ortgiesen; Marc Ross; Pier Oddone; Young-Kee Kim; Stephen Holmes; Hugh Montgomery; Cindy Conger; Robert Kephart; Bill Griffing
Cc: Bob Grant; Judy Jackson; Bo Arnold
Subject: Laboratory Collaboration Council

The FRA proposal provides for the establishment of an ANL-FNAL Laboratory Collaboration Council chaired by the two Directors. Now that we are under the FRA banner the first meeting of the Council will soon be scheduled. As an activity to prepare for that meeting, Bo Arnold (ANL-COO) and I met and agreed that it would be a good idea if we developed a list, as background for the council, of all the current shared activities. For example, remote backup computer sites, the electronics recycling program, the tech transfer licensing MOU, the ILC work, etc. Bo and I agreed that we probably weren't aware of all the activities in which the labs share. Therefore, I am asking if you will provide me with information concerning any such activities of which you are aware. Please provide the information to me along with a brief one paragraph description of each activity. Bo said he would ask the ANL managers for a similar list to be sure we captured all such shared endeavors. I would appreciate receiving the information on or before January 26.

--

Thanks,

Bruce